



# M x V = Spending

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**Grade Levels: 9,10,11,12**

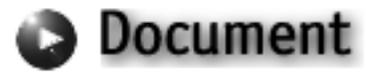
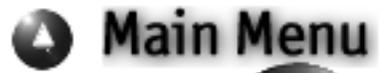
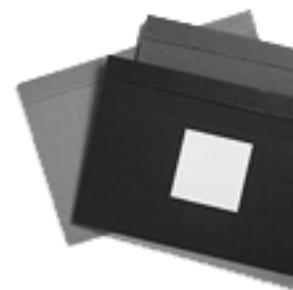
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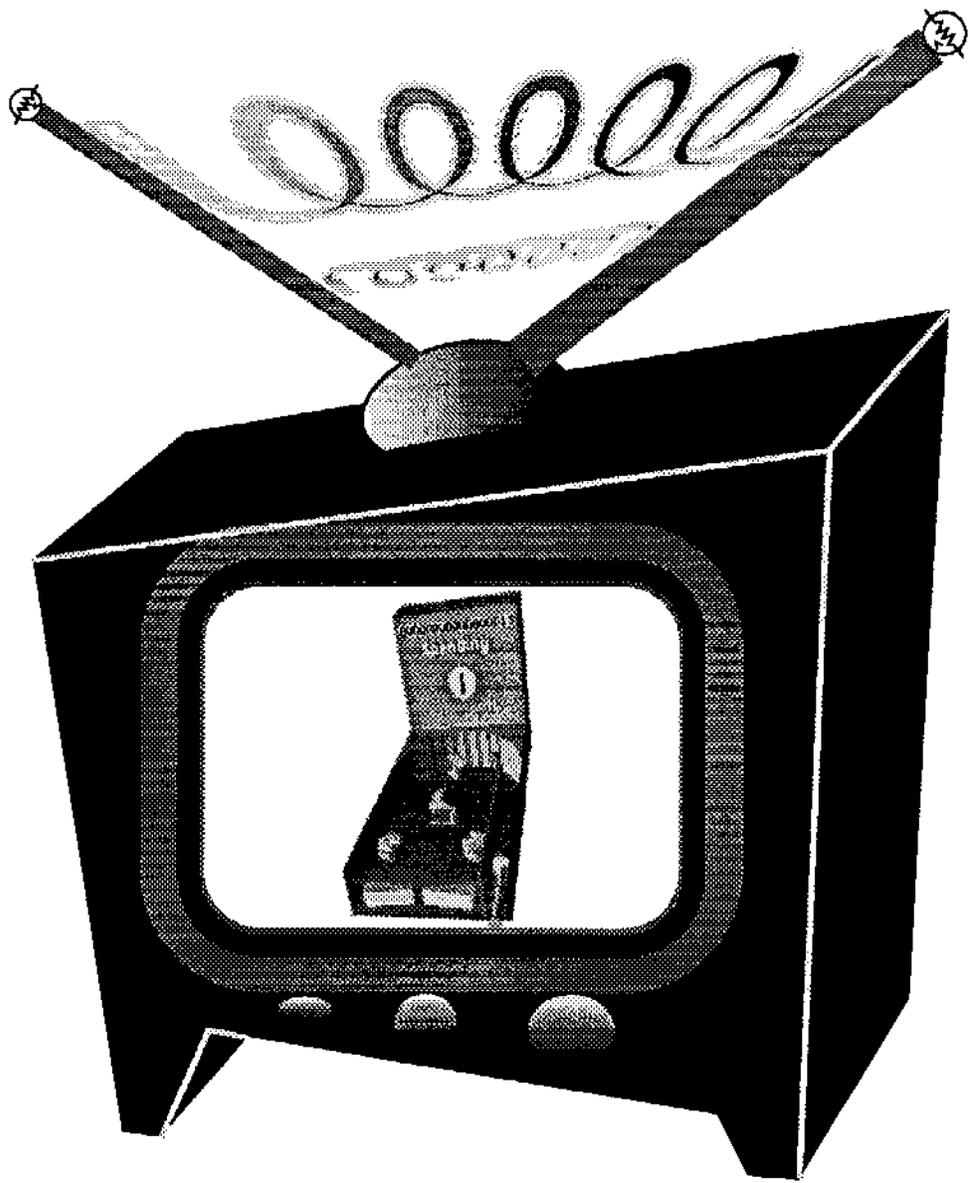
## **Description:**

This document is designed to accompany a video of a computer-animated pinball machine to show how changes in the money supply and the velocity of money (how quickly money is spent in a period of time) affect overall spending in the economy.



This document may be printed.





## **M x V = SPENDING**

### **THE VIDEO PROGRAM**

"M x V = Spending," the Velocity Module, is part of a computer-animated series of four to five minute modules illustrating standard concepts in high school economics.

"M x V = Spending" describes the relationship between the supply of money and total spending in the economy. A key component of this relationship is the concept of the velocity of money, the number of times money changes hands in a given time period.

A computer-animated pinball machine is used to represent the economy and illustrate how the money supply and the velocity of money affect total spending in the economy. A \$1.00 coin serves as the total amount of money circulating in the economy. Each time the coin ricochets from a pinball bumper, money is being spent. The scoreboard totes each instance of spending within a specified time period demonstrating how total spending is greater than the money supply because of velocity.

A second sequence examines the relationship between the money supply, velocity, and total spending within the mathematical equation,  $M \times V = \text{Spending}$ .

### **THE CURRICULUM MATERIALS**

The **M x V = Spending** curriculum materials are designed to accompany the video program, but may be used independently depending upon the teacher's particular needs. The **Economic Content** section provides teachers with supplemental economic background information to facilitate the use of the materials in the classroom. **Before the Viewing** activities introduce students to the concept of the velocity of money within the equation  $M \times V = \text{Spending}$  to enhance their comprehension while viewing the video program. **After the Viewing** activities expand upon the concepts presented in the video and give students a chance to practice their understanding of these concepts through interactive classroom discussions and student worksheets.

## ECONOMIC CONTENT

When does a dollar bill buy more than a dollar's worth of goods and services?

" $M \times V = \text{Spending}$ " opens with this riddle. The answer holds the key to the relationship between money and spending in the economy. A dollar bill buys more than a dollar's worth of goods and services when it is spent more than once.

As a medium of exchange, money changes hands frequently among households, businesses, and the government when they spend money. Money recirculates as each dollar spent becomes someone else's income to spend again. The concept of money being spent over and over again is embodied in the term, "velocity." The velocity of money is the number of times the average dollar circulating in the economy is spent on final goods and services within a given time period. Velocity is key to the relationship between the money supply and total spending. Because of velocity, total spending can be greater than the amount of money in circulation.

Looking at the equation,  $M \times V = \text{Spending}$ , "M" represents the money supply components most commonly used for everyday spending, "V" represents the velocity of money while "Spending" represents the dollar value of all goods and services produced in the economy.

The equation  $M \times V = \text{Spending}$  is a useful framework for understanding how monetary policy works. As our nation's central bank, the Federal Reserve is responsible for conducting monetary policy and managing the money supply. In conducting monetary policy, the Federal Reserve seeks to target money growth rates which foster steady economic growth, stable prices, and high employment. Through measuring and studying the determinants of M and V and their relationship to spending in the economy, the Federal Reserve seeks to fine-tune the impact of monetary policy on economic activity.

If the money supply grows too rapidly, stimulating spending, production may not be able to grow enough to keep up with the increase in aggregate demand for goods and services. Prices will start rising leading to inflation. In contrast, if the money supply grows too slowly, spending and production may drop off, leading to recession and unemployment.

## INFLUENCES ON M — THE MONEY SUPPLY

Economists have devised numerous measures of the money supply to pinpoint the impact of changes in the money supply and spending on economic activity. **M1**, the narrowest definition, consists of money typically used for everyday transactions — coins and currency in people's hands plus checking account funds and travelers' checks. **M2**, the broader definition, includes M1 plus "savings" money — passbook savings accounts, money market mutual funds, money market deposit

accounts, and certificates of deposit. The measures of the money supply also can be thought of in terms of their relative liquidity, that is, how easily the various types of money and assets can be converted into cash. Everything included in M1 is completely liquid while M2's savings components are somewhat less liquid.

Until the 1980's, economists primarily focused on M1 to study the relationship between the money supply and spending in the economy. Since that time, technological innovation has combined with deregulation within the banking industry to blur the historical distinctions between M1 and the savings components of M2. Now, many of M2's savings assets can readily be used as transaction money or can easily be turned into transaction money. Deregulation has allowed financial institutions other than commercial banks to offer checking accounts and has introduced a multitude of new interest-bearing financial assets that have check-writing privileges. With the advent of ATMs and electronic funds transfer, savings funds can easily be transferred to checking accounts and used for everyday spending.

The variables within  $M \times V = \text{Spending}$  have undergone some transformations as a consequence of this evolution within money and banking. In 1982, the Federal Reserve shifted its focus to M2 rather than M1 as a more predictable long-term barometer of total spending in the economy because M2's velocity has shown greater stability and predictability in the long run than the velocity of M1.

" $M \times V = \text{Spending}$ ," mentions two sources for altering the money supply —banks as they lend amounts equal to their excess reserves which creates new checkbook dollars and the Federal Reserve.

Through **multiple deposit creation**, banks create new checkbook dollars when they lend amounts equal to their excess reserves. Banks must set aside a fraction of each new deposit as **required reserves**, and may lend amounts equal to the remaining **excess reserves**. Loans take the form of new checking accounts for the borrower which increases the checkbook portion of the money supply. The increase in the money supply doesn't stop here. Borrowers spend their loans by writing checks which are deposited into other banks. After setting aside the required reserve portion of the new deposits, these banks may lend amounts equal to the remaining excess reserves. This multiple deposit and money creation process continues until all excess reserves have been absorbed into the banking system's required reserves.

As the money manager in our economy, the Federal Reserve is responsible for implementing monetary policy through altering the growth rate of the money supply. To increase or decrease the money growth rate, the Fed attempts to alter the amount of excess reserves in the banking system that are used as a guideline for lending. The Fed has three monetary policy tools for influencing reserves: 1) altering reserve requirements; 2) altering the discount rate —the rate at which banks borrow from the Fed; and 3) Open Market Operations —the buying and selling of government securities on the open market.

The Fed rarely alters the discount rate or reserves requirements to implement monetary policy. This is because it's hard to gauge how often banks will borrow from the discount window and changing reserve requirements can have a disruptive impact on bank lending activities and new checkbook money creation. Open market operations is the Fed's chief monetary policy tool. When the Federal Reserve buys government securities, new reserves are introduced into the banking system in the form of a new checking deposit for the securities dealer. This new deposit triggers multiple rounds of lending and deposit creation increasing the checkbook portion of the money supply. When the Fed sells government securities, the private dealers' deposits are transferred from their checking accounts to the Federal Reserve as payment. This drains reserves from the banking system, and triggers a decrease in the money supply through a cycle of multiple deposit destruction.

## **INFLUENCES ON V — VELOCITY**

As " $M \times V = \text{Spending}$ " points out, the velocity of money is not constant. Velocity changes in response to fluctuations in our demand for money. When our demand for money increases, we wish to hold higher cash balances relative to our income. Velocity falls as we spend money less quickly. When the demand for money decreases, the opposite is true. We tend to hold lower money balances relative to our incomes. Velocity increases as we spend money more rapidly.

The demand for money may change for a variety of reasons. **Uncertainty about the future** is a key reason why individuals and businesses may demand more money and choose to hold higher money balances relative to their incomes. If businesses and individuals anticipate a **recession**, their demand for money will increase and they will hesitate to spend money causing velocity to drop. Similarly, expectations of future layoffs, or an increase in unemployment, also causes velocity to fall as our demand for money rises in response to the uncertain times.

**Inflation** is another factor that can influence our demand for money. Inflation erodes the purchasing power of money leading individuals and businesses to hold as little money as they need to get by on. Expecting that money might not buy as much in the future, they spend money faster, thus, increasing the velocity of money.

The **interest rate** that can be earned on various types of interest bearing assets is another determinant of velocity. This interest rate represents the opportunity cost of holding money, that is, what we are not earning on our cash when we choose to hold it rather than invest our money in these assets. Although some checking accounts which are included in M1 earn interest, many alternative stores of value pay higher rates. The higher these alternative rates of interest, the greater the incentive to economize on holding cash balances relative to income. Therefore, as interest rates rise, the demand for money falls causing velocity to rise as the existing stock of money circulates faster. In contrast, when interest rates fall, the opportunity cost of holding money decreases, people tend to hold higher money balances, the demand for money increases and the velocity of money drops.

Technological innovation also has impacted the velocity of money. Now that funds can readily be transferred between checking accounts and interest-bearing financial assets, lower money balances can support everyday transactions in our economy. This increased efficiency of the payments mechanism may induce us to purchase savings assets and make periodic transfers to checking accounts as necessary rather than holding higher money balances for our everyday spending needs. The result, money circulation has increased over time in response to the increased efficiency of the payments mechanism.

## **INFLUENCES ON "TOTAL SPENDING"**

As mentioned previously, "Spending" in the equation  $M \times V = \text{Spending}$  represents the dollar value of all final goods and services produced in the economy within a given time period, usually a year. The video program depicts **Gross National Product (GNP)** as the primary measure of U.S. production. In December 1991, the U.S. Department of Commerce shifted to the use of **Gross Domestic Product (GDP)**, rather than GNP, as the chief measure of our country's production of goods and services. While GNP includes the value of final goods and services and U.S. capital produced by U.S. residents regardless of their geographical location, GDP measures the value of final goods and services produced only within the geographical boundaries of the U.S. An important distinction between the two measures is that GDP includes income payments to foreigners and excludes income receipts by U.S. residents living abroad while GNP is just the opposite. **Figure 1** illustrates the distinctions between GNP and GDP.

The Commerce Department shifted its focus to GDP to better reflect the economy's performance. The switch also conformed the U.S. with the practices of other industrialized countries which use GDP as their primary measure of production, making comparisons easier.

GDP measures the dollar value of **final** goods and services produced in the U.S. within a given year. What is a final good or service? One that is purchased by an enduser and not purchased for resale or manufacturing use. A consumer's purchase of an automobile is an example of a final good because the purchase is made by an enduser.

While this transaction is included in GDP, the value of the materials used to make the car, such as steel, the engine, tires, paint, and labor are not counted in GDP because they were purchased for manufacturing use to make the car. The materials and labor used to manufacture the car are examples of **intermediate** goods and services. Intermediate goods and services are the inputs used to produce final goods and services.

Why are intermediate goods and services excluded from the GDP measure? **Table 1** answers this question by following the various stages of production of a cotton

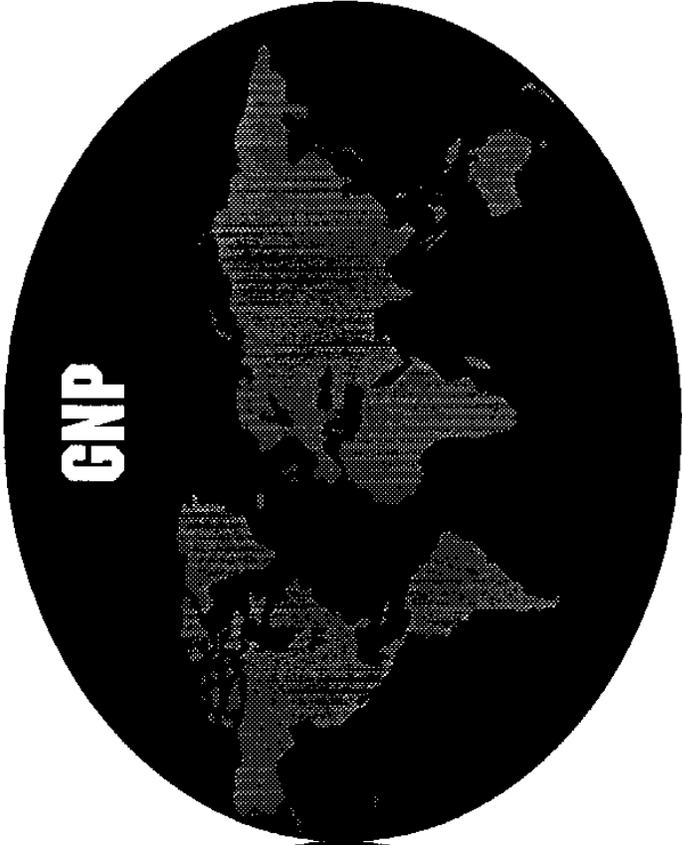
sweatshirt—from the cotton farmer to the retail department store. The total contribution to GDP in this example equals \$250, the amount of the final sale of the sweatshirts by the retail department store to its customers. If the value of the intermediate goods and services used to make sweatshirts—the textile mill's purchase of cotton from the farmer, the sale of milled cotton to the clothing manufacturer, and the manufacturer's sale of the sweatshirts to the retail department store—were included in GDP, the measure would be inflated to \$490. This is because the value of these intermediate items would be double and triple counted through each stage of production to the final product.

**TABLE 1**  
**INTERMEDIATE AND FINAL GOODS**

| <b>GOODS</b>                  | <b>SELLER</b>    | <b>BUYER</b>     | <b>PRICE</b>    | <b>VALUE ADDED</b>           |
|-------------------------------|------------------|------------------|-----------------|------------------------------|
| <b>(STAGES OF PRODUCTION)</b> |                  |                  |                 |                              |
| Cotton                        | Farmer           | Textile Mill     | \$ 40.00        | \$ 40 - \$ 0 = \$ 40         |
| Cotton Cloth                  | Textile Mill     | Clothing Mfg.    | \$ 75.00        | \$ 75 - \$ 40 = \$ 35        |
| Sweatshirts                   | Clothing Mfg.    | Department Store | \$125.00        | \$125 - \$ 75 = \$ 50        |
| Sweatshirts                   | Department Store | Consumers        | <u>\$250.00</u> | \$250 - \$125 = <u>\$125</u> |
|                               |                  |                  | \$490.00        | <b>\$250</b>                 |

**Additions to GDP = sale of the final product \$250.00 = sum of "values added," \$250.**

Introducing the concept, **value added**, will further clarify why intermediate items are excluded from the GDP measure. Each stage of production of a product adds value as various inputs are used to make the final product. In **Table 1**, the textile mill has increased the value of cotton by turning it into cotton cloth. Once the cotton was milled into cloth, its value rose from \$40.00 to \$75.00, an increase of \$35.00. This is true for each progressive stage of sweatshirt production as shown in the "value added" column of **Table 1**. Note that the total of the "value added" column, \$250, is the same as the value of the final product —the \$250 worth of sweatshirts the department store sold to its customers. By totaling the value added by each stage of sweatshirt production rather than counting the full value of the intermediate items used to make the sweatshirts, we've avoided the problem of double counting the value of intermediate goods and inflating GDP.



This "value added approach" is another method economists use to measure GDP. By totaling the values added through each stage of production for all final goods and services produced in the economy, not just sweatshirts, we can derive GDP. And as illustrated by the sweatshirt production example, deriving this total yields the same result as tallying the dollar amounts of all final goods and services produced in the economy.

As an economic indicator, GDP by itself doesn't reveal very much about economic activity because it doesn't account for the impact of inflation or higher prices on the level of output when making comparisons between years. For example, if the economy produces only baseballs, a rise in GDP from one year to the next may indicate only that the price of baseballs has increased not that the economy is producing more baseballs. Deflation, or a fall in the general price level, also can distort what is happening to the economy's real level of output.

In order to compare the amount of goods and services produced in different years, economists adjust the GDP measure to reflect changes in prices. This adjusted measure is called **real GDP**. Recall that GDP values all final goods and services at **current** prices in a given year. Economists derive real GDP by valuing all final goods and services at the prices that prevailed in some agreed upon base year —currently 1987. This allows economists to compare levels of output for different years.

By comparing real GDP for different years, economists determine the rate of economic growth or decline in the production of goods and services. During periods of economic growth, real GDP expands, and there are more goods and services for people to buy. There also are more jobs available to support the growing economy and a larger tax base to fund government projects.

When the economy is in a recession, the opposite is true. Real GDP declines, unemployment tends to rise, and there are fewer goods and services available for people to purchase. Less income means a smaller tax base to support government programs such as education.

Both GDP and Real GDP often are referred to by other names. Because GDP values all the goods and services produced in a given year at current prices, it is also called nominal or money GDP. Real GDP is often called GDP in constant dollars, adjusted GDP or GDP in 1987 (current base year) dollars.

### **THE EQUATION OF EXCHANGE: $M \times V = Q \times P$**

$M \times V =$  Spending is the first-half of the equation of exchange,  $M \times V = Q \times P$ . Economists use this equation to interpret the impact of changes in the money supply on production and prices in the economy. The second half of the equation,  $Spending = Q \times P$ , and the equation itself are detailed in the video program "Spending =  $Q \times P$ " and its accompanying curriculum materials. Generally, the equation of exchange explains how increases in the money supply lead to increases in production when the

economy is producing below its capacity level. Once the economy reaches capacity, production can no longer grow enough to keep up with the aggregate demand for goods and services. At this point, increases in the money supply only lead to higher prices or inflation.

## BEFORE THE VIEWING

Write the equation  $M \times V = \text{Spending}$ , on the board and define the variables for the class. Tell your students that this equation is used to explain the relationship between the money supply and spending in the economy. Explain that the velocity of money is a key component of this relationship.

To enhance your students' understanding of the concept of velocity, lead them through the following simulation. Ask for 10 volunteers —distribute 10 pencils or other inexpensive items of similar value to the volunteers. Explain that in the classroom economy, the money supply,  $M$ , will total \$1.00, and the economy only produces pencils. Further explain that the objective is to buy and sell pencils within a 15 second time period to find out what happens to the money supply, velocity and total spending in the classroom economy. Recruit another volunteer who will count the number of times the \$1.00 is exchanged for each pencil within the 15 second time period.

To begin the simulation, ask the students holding candy and the recruit who will count the transactions to stand. Note the beginning of the 15 second time period and then use the \$1.00 to buy a pencil from one of your students. This student, in turn, should use the \$1.00 to buy a pencil from one of the other students. Have the students buy and sell pencils within the 15 second time period. Ask the student who counted the number of pencil transactions how many times the dollar was spent and respent in the classroom economy. Follow by asking the class what the velocity of money was in the simulation (the number of times the \$1.00 was spent and respent). Explain that this is what happens in the real economy, but on a much larger scale, with the money supply being spent and respent as households, businesses, and the government purchase the goods and services they need.

To help your students understand velocity within the equation  $M \times V = \text{Spending}$ , ask what happened to  $M$ ,  $V$  and total spending in the classroom economy in the simulation. For example, let's assume that the \$1.00 was spent and respent five times to purchase pencils within the 15 second time period. Ask the class what happened to  $M$ ,  $V$  and total spending in the classroom economy. ( $M$  remained the same, \$1.00;  $V$  equals five; total spending equals \$5.00). Ask the class why total spending was greater than the money supply? (Because of velocity —money is spent over and over again which enables total spending to be greater than the amount of money in circulation). Ask the class what would happen to total spending if  $V$  increased to 6 or dropped to 4 to illustrate the impact of an increase or decrease in velocity on total spending in the economy.

To help your students understand the impact of changes in the money supply on total spending, ask the class what would happen to total spending if  $V$  remained 5 while  $M$  increased to \$2.00? Dropped to \$.50 (Total spending increases to \$10.00 in the first instance and drops to \$2.50 when  $M$  is \$.50.) Conclude the discussion by emphasizing that a change in the money supply, velocity or both will impact total spending in the economy.

Explain to the class that they are going to watch a program which takes a look at the equation  $M \times V = \text{Spending}$ . Ask the class to look for the answers to the following questions as they view the program:

1. When does a dollar bill buy more than a dollar's worth of goods and services?
2. What kinds of money are included in M in  $M \times V = \text{Spending}$ ?
3. What economic term represents total spending? (The video portrays **Gross National Product (GNP)** as the primary measure of total spending in the economy. As of 12/91, GNP has been replaced by **Gross Domestic Product (GDP)** as the principal measure of U.S. production. The shift is outlined in the **Economic Content** and **Activity 3** of these materials.)

### **AFTER THE VIEWING**

Write the equation,  $M \times V = \text{Spending}$  on the board. Ask the class which variable in the equation answered the riddle —When does a dollar bill buy more than a dollar's worth of goods and services? (Velocity - Each dollar circulating in the economy is spent more than once.) Review the definitions of the variables within the equation and the impact of increases/decreases in M or V on total spending. Incorporate the answers to the questions the students looked for as they viewed the program in your review.

To help your students understand the importance of this equation, ask the class to speculate as to what happens in the economy when spending increases or decreases. To focus their thinking, ask what do they think happens when they spend more or less money at their local stores? (Generally, if the economy is producing below capacity, spending stimulates economic growth, there are more goods and services to buy and more jobs open up to support the growing economy. A drop in spending has the opposite amplified impact.)

## UNDERSTANDING M X V

### ACTIVITY 1: M - THE MONEY SUPPLY

#### OBJECTIVES:

Students will be able to:

1. Identify types of money that represent M within  $M \times V = \text{Spending}$  and explain how these components of the money supply impact spending.
2. Explain the impact of increases/decreases in the growth of the money supply on the economy through spending.

#### PROCEDURE

1. Write the equation  $M \times V = \text{Spending}$  on the board. Review the impact of increases/decreases in the money supply on total spending. To spotlight which money supply components are considered within the equation, ask the class whether a \$100 bill or a \$100 savings bond would have a greater immediate impact on spending in the economy? Why? (Money that can be readily spent for everyday purchases has the most direct impact on spending in the economy. The \$100 bill is readily accepted as a medium of exchange for most purchases while the \$100 savings bond is not.)
2. Ask the class to recall and define the various measures of the money supply. Which measure is used as a medium of exchange for everyday purchases. (M1- coins and currency in people's hands plus the funds available in checking accounts.)

To help your students understand the shift to M2 as the most closely watched measure of the money supply, ask the class to recall the definition of M2 (M1 plus savings type accounts). Can they think of any reasons why some savings accounts might readily be used for everyday spending? What impact do they think ATM's have had on money? (As outlined in the **Economic**

#### Content

portion of these materials, now many of M2's savings components can easily be used for everyday spending due to advances in electronic technology and diversity of financial products introduced as a result of deregulation in the 1980's.)

As a follow-up to the discussion, ask your students to research and report the latest M1 and M2 statistics and to bring a newspaper article which discusses the money supply to class. (M1 and M2 statistics are usually listed in the newspaper. This information also is published by the Board of Governors of the Federal Reserve System —Publication H.6 (508), "Money Stock, Liquid Assets,

and Debt Measures.")

3. **Worksheet 1 - Applying  $M \times V = Spending$** , at the end of **Activity 2**, incorporates the concepts presented in the above discussion, and gives your students a chance to practice their understanding of these concepts.

## ACTIVITY 2: V - THE VELOCITY OF MONEY

### OBJECTIVES

Students will be able to:

1. Define **velocity** and understand its relationship to total spending in our economy.
2. Explain some of the economic determinants of velocity (inflation, recession, interest rates) and their impact on total spending and the economy.

### PROCEDURE

1. Write the words, "velocity of money" on the blackboard and ask your students to define the term. Write the equation  $M \times V = \text{Spending}$  on the board and review with your class the impact of increases/decreases in velocity on total spending in the economy.
2. Explain to the class that the velocity of money depends upon the many reasons we want to hold on to or spend our money. To help your students understand some of the economic determinants of velocity and their impact on spending and the economy, ask the class to think of reasons why they or their families might want to hold on to their money or spend it more quickly. To stimulate the discussion, ask if they can think of any economic conditions which might impact velocity. (**Inflation** - Velocity tends to increase causing money to circulate more quickly and spending to rise since people anticipate that their money won't buy as much in the future. **Recession** - Velocity tends to fall since people are uncertain and people hesitate to spend money. Spending drops as money circulates less quickly and the economy slows down.)
3. As  $M \times V = \text{Spending}$  pointed out, interest rates are another determinant of the velocity of money. To help your students understand the impact of interest rates on velocity, hold up a dollar bill and ask the class the price or opportunity cost of holding money. If nothing comes to mind, ask what they are giving up by saving their money underneath their mattresses rather than investing it. (interest). Ask the class to examine the impact of increases/decreases in interest rates on the velocity of money. (When interest rates are higher, people tend to hold less money and the existing stock of money circulates faster. When interest rates fall, the opposite is true.)
4. To reinforce and expand upon the concepts presented in this activity, distribute copies of **worksheet 1 - Applying  $M \times V = \text{Spending}$** .

**WORKSHEET 1**  
**APPLYING  $M \times V = \text{SPENDING}$**

Please answer the following questions or circle the correct answer as required based on the equation,  $M \times V = \text{Spending}$ .

1. In  $M \times V = \text{Spending}$ , M stands for \_\_\_\_\_ and V is defined as \_\_\_\_\_ while total spending represents \_\_\_\_\_.
2. The economic term for total spending in the economy is \_\_\_\_\_.
3. Explain in general terms what happens to jobs and the quantity of goods and services in the economy when spending increases. What happens when spending decreases?
4. If the money supply is less than total spending in the economy within a year, what does this tell us about the velocity of money?
5. What is the velocity of a dollar if it is used in the following purchases during a particular year? A customer spends the dollar at the barber shop to help pay for a haircut. The barber, in turn, uses this same dollar to help purchase a new shirt. The storekeeper then uses this same dollar to help fill up his gas tank while the gas station owner takes this dollar and spends it on Christmas presents for his family.
6. If the money supply consists of a \$20.00 bill which was spent and respent six times during a given year, what was total spending for that year?
7. Too much spending in the economy can lead to inflation which means higher prices. If you were formulating monetary policy by altering the growth of the money supply, how would you keep total spending from rising too fast if velocity increased?
8. Too little spending in the economy can lead to a recession. If you were formulating monetary policy, how would you keep total spending the same if velocity decreased?
9. The velocity of money depends on the economic reasons why we want to hold on to our money or spend it more quickly. Listed below are two newspaper headlines which report some historical events that impacted the U.S. economy. What do you think happened to the velocity of money during these economic times? Explain your answers.
  - a. **1929** "Stock Market Crashes on "Black Thursday" Oct. 24 —Signals an End to Prosperity."
  - b. **1979** "U.S. inflation rate is 13.3 percent —the highest in 33 years."
10. The interest rates we can earn on various kinds of savings assets also can impact the velocity of money. If interest rates rose so that you could earn a 12% return on your money if you invested it, what do you think would happen to the velocity of money?

Explain your answer. What do you think would happen to the velocity of money if the interest rate you could earn dropped to below 3%? Explain your answer.

**WORKSHEET 1 - ANSWER SHEET**  
**APPLYING  $M \times V = \text{SPENDING}$**

Please answer the following questions or circle the correct answer as required based on the equation,  $M \times V = \text{Spending}$ .

1. In  $M \times V = \text{Spending}$ ,  $M$  stands for *the money supply* and  $V$  is defined as *the velocity of money —the number of times the average dollar is spent within a given time period* while total spending represents *total spending for all final goods and services produced in the economy*.

2. The economic term for total spending in the economy is *Gross Domestic Product (GDP)*.

3. Explain in general terms what happens to jobs and the quantity of goods and services in the economy when spending increases. What happens when spending decreases? *Generally, increases in spending stimulate the creation of new jobs and increased output as the economy responds to the increase in demand for goods and services. Decreases in spending would tend to have a dampening impact on jobs and output in the economy.*

4. If the money supply is less than total spending in the economy within a year, what does this tell us about the velocity of money? *This implies that velocity must be greater than*

*1. Each dollar circulating in the economy is being spent more than once.*

5. What is the velocity of a dollar if it is used in the following purchases during a particular year? A customer spends the dollar at the barber shop to help pay for a haircut. The barber, in turn, uses this same dollar to help purchase a new shirt. The storekeeper then uses this same dollar to help fill up his gas tank while the gas station owner takes this dollar and spends it on Christmas presents for his family. *The velocity would be 4.*

6. If the money supply consists of a \$20.00 bill which was spent and respent six times during a given year, what was total spending for that year? *Total spending would be \$120.00.*

7. Too much spending in the economy can lead to inflation which means higher prices. If you were formulating monetary policy by altering the growth of the money supply, how would you keep total spending from rising too fast if velocity increased? *Decrease the money supply*

8. Too little spending in the economy can lead to a recession. If you were formulating monetary policy, how would you keep total spending the same if velocity decreased? *Increase the money supply*

9. The velocity of money depends on the economic reasons why we want to hold on to our money or spend it more quickly. Listed below are two newspaper headlines which report some historical events that impacted the U.S. economy. What do you think happened to the velocity of money during these economic times? Explain your answers.

a. **1929** "Stock Market Crashes on "Black Thursday" Oct. 24 —Signals an End to Prosperity." *During the Depression, the velocity of money most likely decreased as people and businesses spent less money due to high unemployment and uncertainty about the future.*

b. **1979** "U.S. inflation rate is 13.3 percent —the highest in 33 years." *Inflation erodes the purchasing power of money. Velocity would tend to increase as individuals and businesses spent their money more quickly anticipating that their money might not buy as many goods and services in the future.*

10. The interest rates we can earn on various kinds of savings assets also can impact the velocity of money. If interest rates rose so that you could earn a 12% return on your money if you invested it, what do you think would happen to the velocity of money? Explain your answer. What do you think would happen to the velocity of money if the interest rate you could earn dropped to below 3%? Explain your answer.

*Interest rates represent the opportunity cost of holding money, that is, what we are not earning on our cash when we choose to hold onto it rather than invest our money. The higher the rate of interest, the greater the opportunity cost of holding onto our money. Therefore, as interest rates rise, we tend to want to hold lower money balances relative to our incomes which causes velocity to rise as the existing stock of money circulates faster. A drop in interest rates has the opposite impact.*

## UNDERSTANDING "TOTAL SPENDING"

### ACTIVITY 1: WHAT'S GNP? GDP?

#### OBJECTIVES

Students will be able to:

1. Define the terms **Gross National Product (GNP)** and **Gross Domestic Product (GDP)** and explain the distinctions between these two measures of total spending in our economy.
2. Define the concept of a "final good or service," and explain why only final goods and services are counted when calculating GDP.

#### PROCEDURE

1. Explain to the class that they are going to take a closer look at the Spending component of the equation  $M \times V = \text{Spending}$ . To introduce the topic, review the impact of changes in spending on the economy —jobs, prices, and economic growth —as outlined in the **After the Viewing** activities.
2. To introduce the concept, **Gross National Product (GNP)**, as a measure of U.S. production, ask if anyone in the class can recall from the video the economic term for total spending in the economy. (Gross National Product (GNP) - dollar amount spent by households, businesses, and the government on final goods and services produced in the economy within a year).
3. Display copy of **Figure 1** (contained in the **Economic Content** section) illustrating the distinctions between GNP and **Gross Domestic Product (GDP)**. Explain to the class that economists have switched (12/91) to using GDP rather than GNP as a more accurate measure the U.S. economy's production of goods and services. Differentiate between the two measures, as outlined in the **Economic Content** portion of these materials, using **Figure 1** to illustrate the discussion. To enhance your students' understanding, ask the class for some examples of goods and services that would be counted in GNP. GDP?
4. Review the definition of GDP for your students, emphasizing that GDP counts the market value of **final** goods and services produced in the U.S. economy within a given year. Explain that a final good or service is one purchased by an enduser —not purchased for resale or manufacturing purposes. Indicate that GDP only counts final goods and services to avoid counting the value of some goods and services more than once. To facilitate your students' understanding of a final good or service, display the following two lists illustrating examples of

goods and services that would be included in or excluded from the GDP measure.

### INCLUDED IN GDP

1. Auto sold from the showroom
2. Items sold in a supermarket
3. Tax consultant services

### EXCLUDED FROM GDP

1. Sale of a used car
2. Vegetables grown for home use
3. Tires sold to a car manufacturer

5. Ask the class to suggest why items in each list are included in or excluded from GDP using the definition of a "final" good or service. For example, the purchase of the American-made car from the showroom floor is an example of a final good and would be included in GDP because it is purchased by an enduser. In contrast, the sale of the materials that went into making the car, such as steel, the engine, tires, paint, and labor would not be counted because they are part of the manufacturing process. Counting the sale of materials and labor that went into manufacturing the car in the GDP measure would inflate the value of GDP since these amounts are already tallied in the automobile's selling price. Ask the class to think of their own examples of final goods and services that would be included in GDP.
6. To further enhance your students' understanding of the distinctions between intermediate and final goods and services, display or distribute copies of **Table 1** contained in the **Economic Content** portion of these materials. **Table 1** illustrates the distinctions between intermediate and final goods and introduces the concept, **value added**, through charting the production path of manufacturing and selling cotton sweatshirt. Using the **Economic Content** section as a reference guide for the discussion, ask the class to distinguish between the intermediate and final goods in the various stages of sweatshirt production. Which amount in **Table 1** would be included in GDP? Why? Introduce the concept, **value added**, and define this concept in terms of the sweatshirt example. In your discussion, note that the dollar amount of the final sale of the sweatshirts is the same as the sum of the "value added" column, \$250.00. This amount represents the sweatshirts' contribution to GDP. Explain that the "value added" approach is an alternative method for measuring GDP. Conclude the discussion by asking the class to think of examples of goods for which they can chart the stages of production to the final product.
7. **Worksheet 1 - Graphing Total Spending and the Money Supply** and **Worksheet 2 - From GDP to Real GDP**, at the end of **Activity 2**, incorporate the concepts included in the above discussion, and give your students a chance to practice their understanding of these concepts.

## ACTIVITY 2: FROM GDP TO REAL GDP

### OBJECTIVES:

Students will be able to:

1. Define the term **Real Gross Domestic Product (Real GDP)**.
2. Differentiate between GDP and Real GDP.
3. Explain the economic implications of a rise/fall in Real GDP.

### PROCEDURE

1. To introduce your students to Real GDP, lead the class through the following discussion. Ask the class to assume that the economy produces only American-made cars. During 1990, the economy produced 10 cars which sold for \$10,000 each. What was GDP for 1990? (\$100,000). During 1991, the economy also produced 10 cars, but they sold for \$150,000. What was GDP for 1991? (\$1,500,000) Ask the class to speculate as to what might have accounted for the rise in GDP from 1990 to 1991 given that output remained the same in both years. (Prices rose —inflation). To show that the rise in GDP between 1990 and 1991 was solely due to a price increase, divide GDP for each year by the 10 cars produced in each of the two years. (Price of the American-made car rose from \$10,000 in 1990 to \$15,000 in 1991.)

Emphasize that GDP doesn't tell us anything about fluctuations in the output levels of goods and services between years because it doesn't account for price changes. Ask the class if they have any suggestions as to how they might remove the effect of prices on GDP? (Adjust for inflation - compare output by valuing output at the price level of a base year). Explain that when economists remove the effect of prices on GDP this is called **Real GDP**, and allows them to compare output for various years.

2. To help your students understand the relevance of Real GDP, ask how many of them have jobs or are looking for jobs. Do they think it would be easier to get a job if Real GDP was growing? Falling? What happens in the economy when Real GDP grows? Drops off? To stimulate the discussion, ask them to recall what happened in the economy when spending increased/decreased. Emphasize that during periods of economic growth, Real GDP expands, generally there are more goods and services to buy and more jobs available to support the growing economy. When Real GDP drops, the economy contracts, there are fewer goods and services available and fewer jobs.
3. To reinforce your students' understanding of the concepts presented in **Activities 1 & 2**, distribute copies of **Worksheet 2 - Graphing Total**

**Spending and the Money Supply and Worksheet 3 - From GDP to Real GDP.**

**WORKSHEET 1**  
**GRAPHING TOTAL SPENDING AND THE MONEY SUPPLY - GDP & M2**

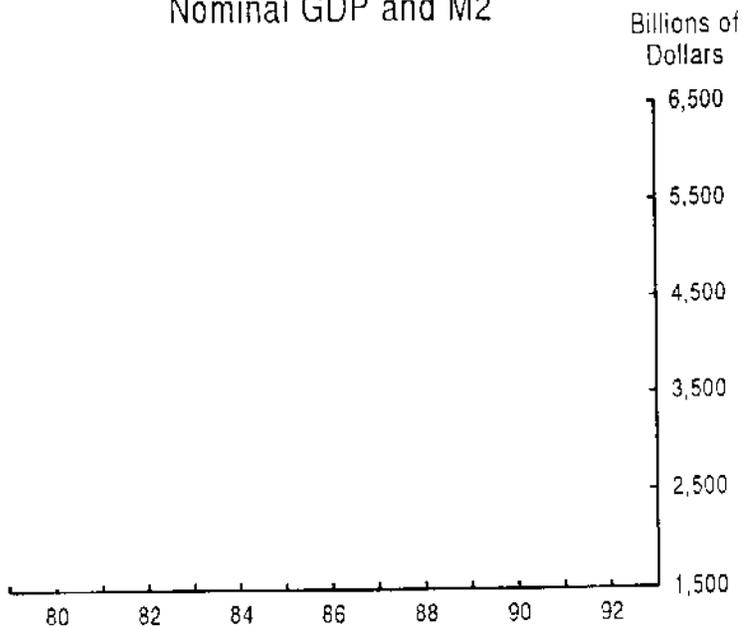
**Part I**

Economists use the equation  $M \times V = \text{Spending}$  to understand the link between the money supply and spending. Within  $M \times V = \text{Spending}$ , M represents the M2 portion of the money supply while V stands for the velocity of money. Total spending represents the amount that households, businesses, and the government spend to buy all the goods and services produced in our economy. Gross Domestic Product or GDP is the economic term for total spending in the economy and is the primary measure of U.S. production. From the information presented in Table 1 below, graph the relationship between the M2 measure of the money supply and GDP for each year from 1980 to 1991.

**TABLE 1**  
**SPENDING AND THE MONEY SUPPLY (M2)**  
**(\$ BILLIONS; ANNUAL AVERAGES)**

| <b>YEAR</b> | <b>GDP</b> | <b>M2</b> |
|-------------|------------|-----------|
| 1980        | 2708.1     | 1567.1    |
| 1981        | 3030.6     | 1715      |
| 1982        | 3149.6     | 1875      |
| 1983        | 3405.1     | 2109.9    |
| 1984        | 3777.2     | 2282.5    |
| 1985        | 4038.7     | 2485.6    |
| 1986        | 4268.6     | 2689      |
| 1987        | 4539.9     | 2867.1    |
| 1988        | 4900.4     | 3015.2    |
| 1989        | 5244       | 3132.2    |
| 1990        | 5513.8     | 3298.3    |
| 1991        | 5672.6     | 3402.3    |

## Nominal GDP and M2



### Part II

Please answer the following questions or circle the correct answer as required based on the data presented in **Table 1** and your graph.

1. Since 1980 Gross Domestic Product (GDP) has been (rising/falling) and the M2? portion of the money supply has been (growing/decreasing).
2. Between 1980 and 1991 total spending was (always/sometimes/never) larger than the amount of money circulating in the economy. Why?
3. From the information presented in Table 1, we can determine that between 1980 and 1991 the velocity of money was (greater than/equal to/less than) 1.
4. To calculate the velocity of money for a particular year, divide GDP for that year by the money supply, M2, for that same year. Use this formula to calculate the velocity of money for each year from 1985 to 1991 using the data in Table 1. Fill in Table 2 below with your calculations. The first calculation is done for you.

**TABLE 2**  
**VELOCITY OF M2**

| <b>YEAR</b> | <b>VELOCITY</b> |
|-------------|-----------------|
| 1985        | 1.62            |
| 1986        | —               |
| 1987        | —               |
| 1988        | —               |
| 1989        | —               |
| 1990        | —               |
| 1991        | —               |

5. Based on your calculations in Table 2, money was spent the most quickly in which year(s)? \_\_\_\_\_ the least quickly? \_\_\_\_\_

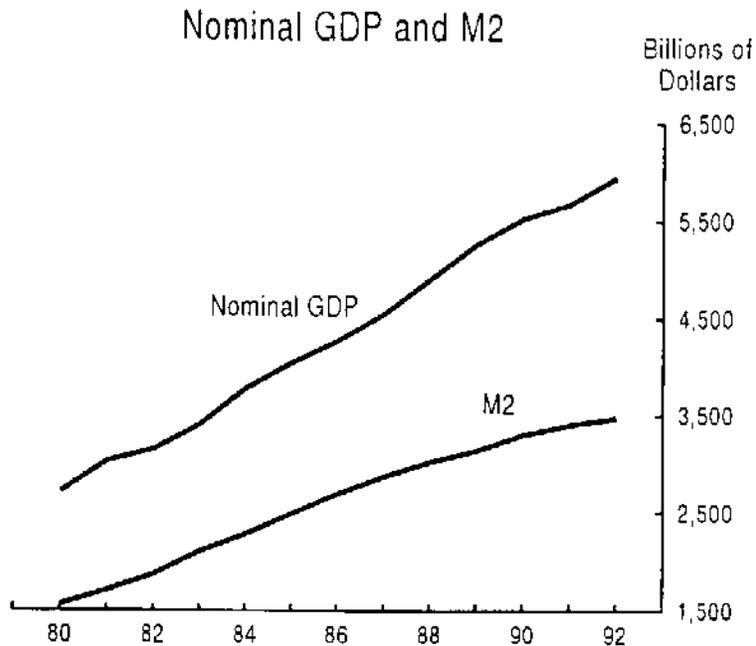
**WORKSHEET 1 - ANSWER SHEET**  
**GRAPHING TOTAL SPENDING AND THE MONEY SUPPLY - GDP & M2**

**Part I**

Economists use the equation  $M \times V = \text{Spending}$  to understand the link between the money supply and spending. Within  $M \times V = \text{Spending}$ , M represents the M2 portion of the money supply while V stands for the velocity of money. Total spending represents the amount that households, businesses, and the government spend to buy all the goods and services produced in our economy. Gross Domestic Product or GDP is the economic term for total spending in the economy and is the primary measure of U.S. production. From the information presented in Table 1 below, graph the relationship between the M2 measure of the money supply and GDP for each year from 1980 to 1991.

**TABLE 1**  
**SPENDING AND THE MONEY SUPPLY (M2)**  
**(\$ BILLIONS; ANNUAL AVERAGES)**

| <b>YEAR</b> | <b>GDP</b> | <b>M2</b> |
|-------------|------------|-----------|
| 1980        | 2708.1     | 1567.1    |
| 1981        | 3030.6     | 1715      |
| 1982        | 3149.6     | 1875      |
| 1983        | 3405.1     | 2109.9    |
| 1984        | 3777.2     | 2282.5    |
| 1985        | 4038.7     | 2485.6    |
| 1986        | 4268.6     | 2689      |
| 1987        | 4539.9     | 2867.1    |
| 1988        | 4900.4     | 3015.2    |
| 1989        | 5244       | 3132.2    |
| 1990        | 5513.8     | 3298.3    |
| 1991        | 5672.6     | 3402.3    |



## Part II

Please answer the following questions or circle the correct answer as required based on the data presented in **Table 1** and your graph.

1. Since 1980 Gross Domestic Product (GDP) has been (rising/falling) and the M2? portion of the money supply has been (growing/decreasing).
2. Between 1980 and 1991 total spending was (always/sometimes/never) larger than the amount of money circulating in the economy. Why? *Between 1980 and 1991 total spending was greater than the money supply because of velocity — each dollar circulating in the economy was spent more than once.*
3. From the information presented in Table 1, we can determine that between 1980 and 1991 the velocity of money was (greater than/equal to/less than) 1.
4. To calculate the velocity of money for a particular year, divide GDP for that year by the money supply, M2, for that same year. Use this formula to calculate the velocity of money for each year from 1985 to 1991 using the data in Table 1. Fill in Table 2 below with your calculations. The first calculation is done for you.

**TABLE 2**  
**VELOCITY OF M2**

| <b>YEAR</b> | <b>VELOCITY</b> |
|-------------|-----------------|
| 1985        | 1.62            |
| 1986        | 1.59            |
| 1987        | 1.58            |
| 1988        | 1.63            |
| 1989        | 1.67            |
| 1990        | 1.67            |
| 1991        | 1.67            |

5. Based on your calculations in Table 2, money was spent the most quickly in which year(s)? 1989 - 1991 the least quickly? 1986

## WORKSHEET 2 FROM GDP TO REAL GDP

**Part I** - Use your knowledge of the economic indicators, Gross Domestic Product (GDP) and Real Gross Domestic Product (Real GDP) to answer the questions below.

1. (GDP/Real GDP) is the value, at current prices, of all final goods and services produced in the U.S. within a year.
2. GDP/Real GDP is the total dollar value of all final goods and services produced in the U.S. in a year, adjusted for inflation or price increases.
3. A final good or service is one that is sold only once/more than once.
4. Gasoline/Texas crude oil is an example of a final good while gasoline/Texas crude oil would not be considered a final good.
5. By comparing GDP/Real GDP from one year to the next we can find out whether or not the amount of goods and services our economy produces has increased or decreased.
6. Generally, when Real GDP is growing that means that there are more/fewer goods and services for people to buy and more/fewer jobs available. When Real GDP contracts, there tends to be more/fewer goods and services for people to buy and more/fewer jobs available.

**Part II: (A) INTERMEDIATE AND FINAL GOODS**

**TABLE 1**

| <b>GOOD</b><br>(Stages of Production) | <b>SELLER</b> | <b>BUYER</b>     | <b>PRICE</b>    | <b>VALUE ADDED</b>             |
|---------------------------------------|---------------|------------------|-----------------|--------------------------------|
| <b>Wheat</b>                          | <b>Farmer</b> | <b>Mill</b>      | <b>\$100.00</b> | <b>(\$100 - _____ = _____)</b> |
| <b>Flour</b>                          | <b>Mill</b>   | <b>Baker</b>     | <b>\$150.00</b> | <b>(\$150 - _____ = _____)</b> |
| <b>Bread</b>                          | <b>Baker</b>  | <b>Grocer</b>    | <b>\$200.00</b> | <b>(\$200 - _____ = _____)</b> |
| <b>Bread</b>                          | <b>Grocer</b> | <b>Customers</b> | <b>\$250.00</b> | <b>(\$250 - _____ = _____)</b> |
|                                       |               |                  | <b>\$700.00</b> | <b>Total = _____</b>           |
|                                       |               |                  |                 | <b>Value Added</b>             |

**TABLE 1** shows the stages of production for bread from the wheat farmer to the grocery store. Please answer the following questions based on the information presented in **Table 1** along with what you know about **intermediate and final goods** and the definition of **value added**.

1. From **Table 1**, list all the intermediate and final goods.
  - a. What is the difference between an intermediate and a final good?
2. Fill in the blanks in the "value added" column to figure out the value added by each stage of production in **Table 1**. Which stage contributed the greatest amount to GDP?
3. What is the dollar amount that is contributed to GDP in **Table 1**?

What are the two ways that you can figure out this amount?

## Part II: (B) GDP AND REAL GDP

**TABLE 2**

**GDP/REAL GDP (\$ Billions; Annual Averages)**

| <b>YEAR</b> | <b>GDP</b> | <b>REAL GDP<br/>(1987 U.S. Dollars)</b> |
|-------------|------------|---|
| 1980        | 2708.1     | 3776.4                                  |
| 1981        | 3030.6     | 3843.1                                  |
| 1982        | 3149.6     | 3760.3                                  |
| 1983        | 3405.1     | 3906.6                                  |
| 1984        | 3777.2     | 4148.5                                  |
| 1985        | 4038.7     | 4279.8                                  |
| 1986        | 4268.6     | 4404.5                                  |
| 1987        | 4539.9     | 4540.0                                  |
| 1988        | 4900.4     | 4718.6                                  |
| 1989        | 5244.0     | 4836.9                                  |
| 1990        | 5513.8     | 4884.9                                  |

**Source: U.S. Department of Commerce**

**TABLE 2** charts Gross Domestic Product (GDP) and Real Gross Domestic Product (Real GDP) from 1980 to 1990. Answer the questions which follow using the information presented in the Table.

1. Overall, from 1980 to 1991 GDP increased/decreased. Generally, from 1980 to 1991, Real GDP increased/decreased.
2. Are there any two year periods in which GDP rose while Real GDP decreased or visa versa? If so, why do you think this would happen?

**WORKSHEET 2 - ANSWER SHEET  
FROM GDP TO REAL GDP**

**Part I** - Use your knowledge of the economic indicators, Gross Domestic Product (GDP) and Real Gross Domestic Product (Real GDP) to answer the questions below.

1. (GDP/Real GDP) is the value, at current prices, of all final goods and services produced in the U.S. within a year.
2. GDP/Real GDP is the total dollar value of all final goods and services produced in the U.S. in a year, adjusted for inflation or price increases.
3. A final good or service is one that is sold only once/more than once.
4. Gasoline/Texas crude oil is an example of a final good while gasoline/Texas crude oil would not be considered a final good.
5. By comparing GDP/Real GDP from one year to the next we can find out whether or not the amount of goods and services our economy produces has increased or decreased.
6. Generally, when Real GDP is growing that means that there are more/fewer goods and services for people to buy and more/fewer jobs available. When Real GDP contracts, there tends to be more/fewer goods and services for people to buy and more/fewer jobs available.

**Part II: (A) INTERMEDIATE AND FINAL GOODS**

**TABLE 1**

| <b>GOOD<br/>(Stages of Production)</b> | <b>SELLER</b> | <b>BUYER</b> | <b>PRICE</b>    | <b>VALUE ADDED</b>     |
|--|---------------|--------------|-----------------|------------------------|
| Wheat                                  | Farmer        | Mill         | \$100.00        | $\$100 - \$0 = \$100$  |
| Flour                                  | Mill          | Baker        | \$150.00        | $\$150 - \$100 = \$50$ |
| Bread                                  | Baker         | Grocer       | \$200.00        | $\$200 - \$150 = \$50$ |
| Bread                                  | Grocer        | Customers    | <u>\$250.00</u> | $\$250 - \$200 = \$50$ |
|  |               |              | \$700.00        | Total = \$250          |

**TABLE 1** shows the stages of production for bread from the wheat farmer to the grocery store. Please answer the following questions based on the information presented in **Table 1** along with what you know about **intermediate and final goods** and the definition of **value added**.

1. From **Table 1**, list all the intermediate and final goods.

*The first three stages —the farmer's sale of wheat to the mill, the mill's sale of flour to the baker, and the baker's sale of bread to the grocer —represent the sale of intermediate goods. The grocer's sale of the bread to its customers represents the sale of a "final" good.*

a. What is the difference between an intermediate and a final good?

*Intermediate goods are the inputs used to make final goods.*

2. Fill in the blanks in the "value added" column to figure out the value added by each stage of production in **Table 1**. Which stage contributed the greatest amount to GDP?

*The first stage, the farmer's sale of wheat to the mill for \$100.00.*

3. What is the total dollar amount that is contributed to GDP in **Table 1**? **\$250.00**

What are the two ways that you can figure out this amount?

*You can look at the price the final good sold for, \$100.00, which is the same amount as the total of the "value added" column.*

## Part II: (B) GDP AND REAL GDP

**TABLE 2**

**GDP/REAL GDP (\$ Billions; Annual Averages)**

| <b>YEAR</b> | <b>GDP</b> | <b>REAL GDP<br/>(1987 U.S. Dollars)</b> |
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| 1981        | 3030.6     | 3843.1                                  |
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| 1989        | 5244.0     | 4836.9                                  |
| 1990        | 5513.8     | 4884.9                                  |

Source: U.S. Department of Commerce

**TABLE 2** charts Gross Domestic Product (GDP) and Real Gross Domestic Product (Real GDP) from 1980 to 1990. Answer the questions which follow using the information presented in the Table.

1. Overall, from 1980 to 1991 GDP increased/decreased. Generally, from 1980 to 1991, Real GDP increased/decreased.
2. Are there any two year periods in which GDP rose while Real GDP decreased or visa versa? If so, why do you think this would happen?

Between 1981 and 1982 Real GDP decreased while GDP increased. This was due to inflation or higher prices which would make GDP increase despite the drop in real output. Similarly, a drop in prices may make GNP drop despite an increase in the economy's real